

in the past to locate *Epifagus* under beech groves in Missouri, and each has been fruitless. The writer several times searched diligently in late autumn in beech groves in southeastern Missouri without locating the elusive beech-drops, and hope for discovering it in the state had been almost forsaken.

During the month of October, 1933, Mr. J. H. Kellogg was collecting on Crowley Ridge in Scott Co., and in a fair-sized stand of *Fagus grandifolia* var. *caroliniana* found *Epifagus virginiana* in plentiful numbers. A number of eastern and southeastern species are known in Missouri only from the Crowley Ridge and adjacent hill section of southeastern Missouri, and the discovery of *Epifagus virginiana* adds still another eastern species to the list.—JULIAN A. STEYERMARK, Missouri Botanical Garden, St. Louis, Mo.

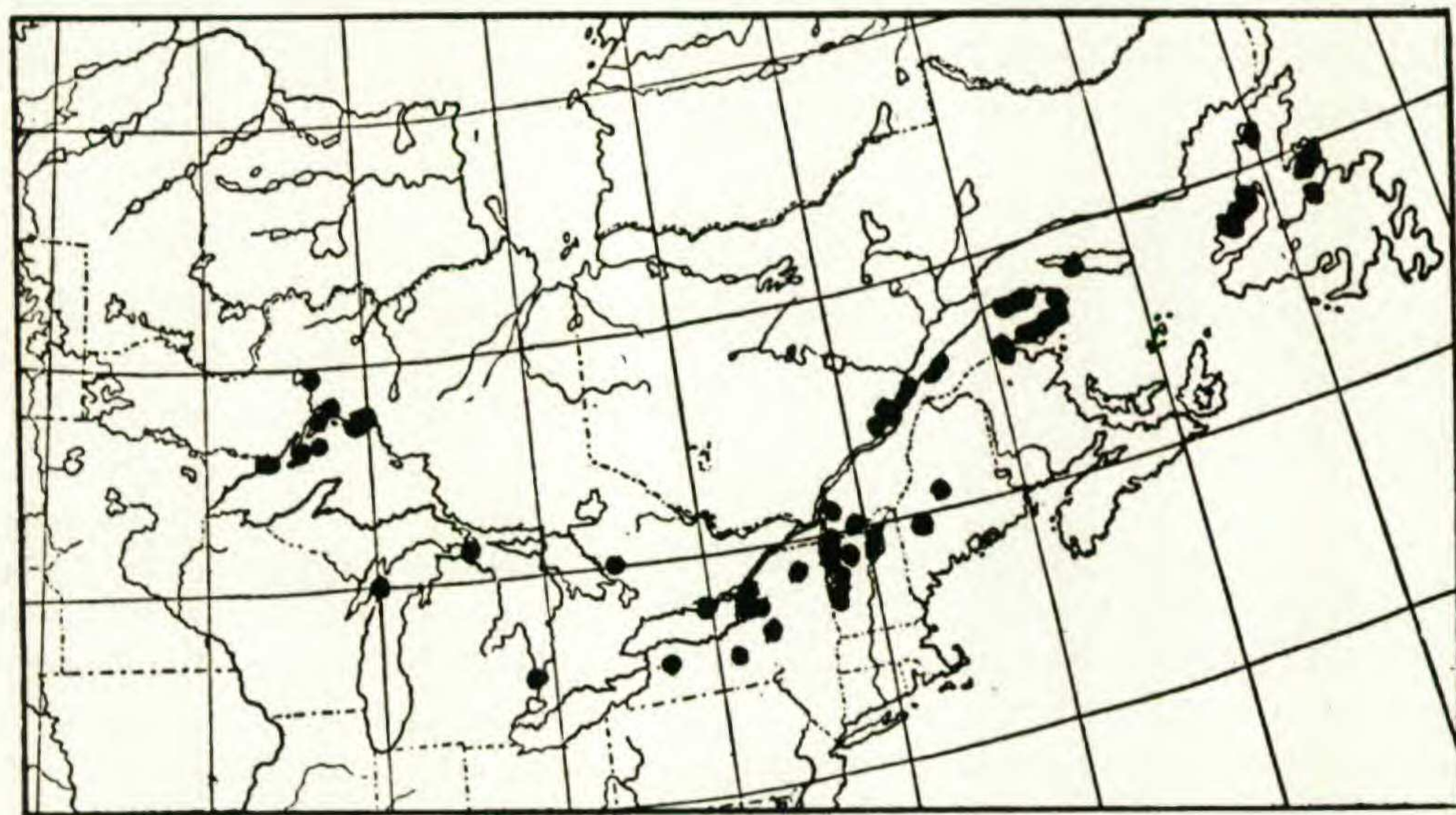
DRABA IN TEMPERATE NORTHEASTERN AMERICA

M. L. FERNALD

(Continued from page 344)

17. *D. ARABISANS* Michx. More or less caespitose *perennial*, forming simple or freely forking mats 0.2–2.5 dm. across, the drab or pale-brown mostly forking caudices retaining fibrous shreds of dead leaves, ending in depressed rosettes 1.5–14 cm. across: *rosette-leaves* oblanceolate or spatulate, entire or somewhat dentate, attenuate to a petiolar base, 0.7–7 cm. long, 0.2–1.6 cm. broad, *thin, closely and minutely* (in shade more sparsely and less minutely) *stellate-pannose*, in age sometimes glabrate: *flowering stems* 1–40, slender, simple to freely branching, *with often flexuous* loosely ascending *branches*, 0.5–4.5 dm. high, glabrous or sparingly to closely *stellate-tomentulose*, rarely with a few spreading and simple trichomes, often glabrate at summit; *cauline leaves* 3–12, oblanceolate, oblong or narrowly obovate, *cuneate to but slightly rounded at base*, serrate-dentate to entire, 0.5–4.5 cm. long, 0.2–1 cm. broad, stellate-pubescent to glabrous: *racemes* corymbiform in flower, *elongating in fruit and rather lax*; the *primary ones* 7–25-flowered, *in fruit* becoming 2–12 cm. long and 1.3–3 cm. in diameter: *pedicels* slender, glabrous or sparsely stellate-pilose, *divergent or arched-ascending*, the lowest 3–15 (rarely –25) mm. long: sepals oblong, obtuse, 1.8–3 mm. long, 1–1.5 mm. broad, glabrous or sparsely hirtellous, white-margined: petals white, broadly obovate, emarginate, unguiculate, 4.5–6 mm. long, 2.8–3.8 mm. broad: anthers 0.5 mm. long: *ovary glabrous, with a distinct slender style: siliques very thin, strongly compressed, glabrous, narrowly lanceolate to narrowly elliptic or ovate, commonly acuminate*, usually twisted but sometimes

plane, 5–15 mm. long, 1.5–3 mm. broad, *with slender style 0.5–1 mm. long; the valves smooth and veinless*, often lustrous: seeds 12–36, oblong or rounded, 1.1–1.7 mm. long.—Fl. Bor.-Am. ii. 28 (1803); DC. Syst. ii. 349 (1821); Torr. & Gray, Fl. N. Am. i. 106 (1838), in large part; Gray, Gen. i. 160, t. 68 (1848); Fern. & Knowlt. RHODORA, vii. 65, t. 60, fig. 9 (1905); O. E. Schulz, l. c. 275 (1927). *D. Arabis* Pers. Syn. ii. 190 (1807). *D. incana*, var. *glabriuscula* Gray, Ann. Lyc. Nat. Hist. N. Y. iii. 223 (1835). *D. Longii* Schwein. ex Torr. & Gray, l. c. (1838) as synonym. *D. incana*, var. *arabisans* (Michx.) Wats. Proc. Am. Acad. xxiii. 260 (1888). *D. arabisans*, var. *orthocarpa* Fern. & Knowlt. l. c. 66 (1905), in part only and excluding the cited type.—Cliffs and exposed ledges of argillaceous, basic or calcareous



MAP 21. Range of DRABA ARABISANS.

rock, Newfoundland to the Lake Superior region of Ontario, south, rather locally, to New Brunswick, Maine, Vermont, New York, Michigan, Wisconsin and Minnesota.—NEWFOUNDLAND: dry cliffs and talus, Tilt Cove, *Fernald, Wiegand & Darlington*, no. 5463; dry rocks, Snook's Arm, *Fernald, Wiegand & Darlington*, no. 2462; ledges and talus, north bank of Exploits R., Grand Falls, no. 5461; calcareous cliffs, ledges and talus, Bard Harbor Hill, *Fernald & Long*, no. 28,367, *Wiegand, Gilbert & Hotchkiss*, no. 28,368; dryish limestone talus, Doctor Hill, *Fernald & Long*, no. 28,366; limestone near crest (alt. 650 m.), Killdevil, Bonne Bay, *Fernald, Long & Fogg*, nos. 1739, 1740; limestone ledges and talus, Shag Cliff, Bonne Bay, *Fernald, Long & Fogg*, no. 1738; dry limestone shingle and talus, Penguin Head, Bay of Islands, *Fernald, Long & Fogg*, no. 1736; dry limestone talus, Druid's (or Raglan) Head, Bay of Islands, *Fernald, Long & Fogg*, no. 1735; slaty cliffs, McIver's Cove, Bay of Islands, *Fernald, Long & Fogg*, no. 1732; sea-cliffs, John's Beach, Bay of

Islands, *Waghorne*, no. 22; cliffs along shore, near Frenchman's Cove, Bay of Islands, *Mackenzie & Griscom*, nos. 10,268, 10,289; talus slopes of marble region between Mt. Musgrave and Humbermouth, *Fernald, Wiegand & Kittredge*, no. 3459; dry limestone ledges and shingle, Hannah's Head, lower Humber Valley, *Fernald, Long & Fogg*, no. 1733. QUEBEC: on shingle, West Point, Anticosti, *J. Macoun* no. 20; dry (inland) calcareous cliffs near Cape Gaspé, *Pease*, no. 20,205; rochers calcaires de la Montagne St.-Alban, vers 300 m. d'alt., *Victorin, Rolland, Brunel & Rousseau*, nos. 17,382, 17,383; talus of calcareous cliffs near Cape Rosier, *Pease*, no. 20,208; calcareous cliffs, Mt. Ste. Anne, Percé, August 18, 1904, *Collins, Fernald & Pease* (*Pease*, nos. 7355, 7356), *Fernald & Collins*, no. 1070, *Victorin, Rolland, Brunel & Rousseau*, no. 17,378, *Pease*, no. 20,241; rocky slope, Round Rock, Grand River, Gaspé Co., June, 1903, *G. H. Richards*, June 30–July 3, 1904, *Fernald*; dry slaty talus of cliffs east of the head of Lac Pleureuse, *Fernald, Dodge & Smith*, no. 25,772; sur les cailloutis calcaires près du Lac Pleureuse, *Victorin, Rolland & Jacques*, no. 33,437; calcareous cliffs and rock-slides by the Gulf of St. Lawrence, Christie, *Fernald & Pease*, no. 25,090, 25,091; trap cliffs at 1800–1900 feet, Tracadigash Mt., Carleton, July 24, 1904, *Collins, Fernald & Pease* (some fruits with 3 carpels); calcareous ledges and cliffs, Bic, many collections, July 16 and 18, 1904, *Collins & Fernald*, July 17, 1904, *Collins & Fernald, Fernald & Collins*, nos. 92, 93 (cotype of *D. megasperma*, var. *leiocarpa* O. E. Schulz), 1066, 1067, 1069, *Rousseau*, nos. 24,833, 26,487, 26,613, 26,695, 26,703, *Victorin, Rolland & Jacques*, no. 33,586; crevices and talus of limestone sea-cliffs, alt. 200–275 m., east of St. Fabien, *Fernald & Collins*, no. 1068; rochers, Île à Deux Têtes, *Victorin*, no. 24,839; argilite, Île aux Grues, *Rousseau*, no. 24,841; Cap à la Branche, Île-aux-Coudres, *Victorin*, no. 4128; sur les roches cambriennes, Grosse-Île, *Victorin*, nos. 15,638, 15,639; dry calcareous cliffs near the shore, Baie St. Paul, *Stebbins*, no. 783; rochers abrupts, Mt. St.-Hilaire, *Victorin*, no. 3867; dry, calcareous cliffs, Gibraltar Point, Lake Memphremagog, *Pease*, no. 11,981. NEW BRUNSWICK: slaty bank, junction of Restigouche and Matapedia Rivers, Quebec-New Brunswick boundary, *Rousseau*, no. 32,335. MAINE: Mt. Kineo, September, 1887, *G. G. Kennedy*; moist ledges, at 1300 ft., Day Mt., Avon, July 24, 1903, *Knowlton*, August 31, 1904, *Knowlton & Chamberlain*. VERMONT: cliffs and summits about Willoughby Lake (Mt. Annance, Mt. Hor, Mt. Pisgah, etc.), many collections from 1854 (*Wm. Boott*)—date; Smuggler's Notch, many collections from 1877 (*Faxon*)—date; "in rupibus ripariis ad lacum Champlain et in Nova Anglia," *Michaux* (TYPE in herb. Michx., Mus. d'Hist. Nat. Paris); Gardiner's Island, L. Champlain, June 17, 1881, *Faxon*, July 2, 1898, *Eggleston*; Four Brothers Island, L. Champlain, June 12, 1908, *N. F. Flynn*; dry ledges, Shelburne Point, L. Champlain, June 25, 1913, *Knowlton*; Charlotte, June 9, 1876, *Pringle*; dry ledges, Mt. Philo, Charlotte, June 5, 1908, *Kennedy*, May 28,

1922, *Knowlton*; Snake Mt., Addison, *Eggleston*, no. 132; limestone cliffs, Cobble Hill, South Bristol, May 28, 1878, *Brainerd*; Mt. Eolus, Dorset, September, 1901, *E. H. Terry*. NEW YORK: southeast face of Wallace Mt., above southern end of Indian Pass, at 3200 ft. alt., Essex Co., *House*, no. 9436; rocky banks of lakes in St. Lawrence and Jefferson Counties, 1833 and 1834, *Asa Gray* (type of *D. incana*, var. *glabriuscula*); on rocks, Trenton Falls, June, —, no. 72 (herb. Torrey); Sackett's Harbor, *W. A. Wood*; Burdick's Glen, Lansing, June 16, 1885, *Dudley*; dry rocks, small ravine north of Esty's Glen, Lansing, *A. J. Eames*, no. 12,081; near Akron, Erie Co., 1864, *Clinton*. ONTARIO: sand-dunes, Picton, June 26, 1886, *Fowler*; plentiful on Lake Muskoka, June, 1916, *N. Tripp* (Herb. Univ. Mich.); North Shore, Lake Superior (between Sault Ste. Marie and Michipicoten), *Loring*; Jack Fish, June 26, 1898, *J. Fletcher*; very abundant on cliffs and gravel, Jack Fish, *Pease*, no. 23,487; dry cliffs, Northern Slate Island, Thunder Bay Distr., *Pease*, no. 23,633; Mt. McKay, September 7, 1889, *Britton*, *Britton & Timmerman*; Lake Nipigon, July 8, 1884, *J. Macoun*. MICHIGAN: Fort Gratiot, *Dr. Z. Pitcher* (type of *D. arabisans* β . Torr. & Gray and of *D. Longii*), in herb. Torrey; bluffs and ledges, Mackinac Island, July 2, 1897, *E. T. & S. A. Harper*, and numerous later collectors; limestone rocks, Prentis Bay, Mackinac Co., *Ehlers*, nos. 1103, 1352, *C. & E. Erlanson*, no. 648; Isle Royale, 1868, *G. A. Marr*, *A. E. Foote*, also *W. S. Cooper*, no. 40, in part (partly var. *canadensis*); base of Monument Rock, Isle Royale, *McFarlin*, no. 2174; island in Rock Harbor, Isle Royale, *McFarlin*, no. 2246; rock-crevices, Passage Island, August 25, 1930, *Povah & Brown*; wind-swept sandstone-conglomerate crest of Lookout Mt., Keweenaw Co., *Fernald & Pease*, no. 3316.¹ WISCONSIN: bluffs on Point Washington, Door Co., June 21, 1891, *Schuette*. MINNESOTA: Grand Portage, $\frac{1}{2}$ mile southeast of the village, *Rydberg*, no. 9666; talus below calcareous cliff, Grand Portage, *Butters & Buell*, no. 367. PLATE 314 and 315, FIGS. 1, 2 and 5; MAP 21.

Var. CANADENSIS (Brunet) Fern. & Knowlt. RHODORA, vii. 67, t. 60, fig. 12 (1905). *D. canadensis* Brunet, Cat. Pl. Can. 21 (1865); O. E. Schulz, l. c. 277 (1927), excluding var. *pycnosperma*.—Low, 0.7–1.5 dm. high; siliques elliptic-ovate, 3–8 mm. long, 2–4 mm. broad.—Scattered locally through the range, perhaps better treated as a form. NEWFOUNDLAND: limestone cliffs and talus, Tucker's Head, Bonne Bay, *Fernald, Long & Fogg*, no. 1749. QUEBEC: rocher, Bic, *Rousseau*, no. 26,322 (as var. *orthocarpa*); crevices of rocks, St. Joachim, Cap Tourmente, 1864, *Ovide Brunet* (TYPE collection), *Rolland*, no. 15,640. MICHIGAN: Isle Royale, *Cooper*, no. 40, in part (mixed with typical *D. arabisans*); wind-swept sandstone-conglomerate crest of Lookout Mt., Keweenaw Co., *Fernald & Pease*, no. 3317, clearly an extreme of the plant with lanceolate siliques. PLATE 315, FIGS. 3, 4 and 6.

¹ This station, discovered since MAP 21 was engraved, should be indicated by a dot near Keweenaw Point.

Draba arabisans is one of the clearest-cut perennial species of temperate eastern America, and its confusion with others has arisen through inadequate understanding of it or reliance upon mere outlines of siliques rather than upon its more significant characters (sufficiently emphasized in the key and the description above). The torsion of the silique (PLATE 314, FIGS. 2, 3 and 4), which is frequent or usual, may be quite lacking (PLATE 314, FIGS. 1 and 5 and PLATE 315) and similar torsion occurs in many other species. *D. arabisans*, var. *orthocarpa*, as already explained, in the discussion of *D. glabella*, as originally conceived was a mixture, the type-collection (PLATE 309) belonging with *D. glabella*. The remnant left in *D. arabisans* is not worthy special recognition, being merely plants with the siliques little or not at all twisted, a very inconstant character.

Var. *canadensis* (PLATE 315, FIGS. 3, 4 and 6) is, presumably, not a very significant extreme. It seems to be a minor variety with siliques of shorter and broader outline than usual. Its retention as a species by Schulz has been discussed, under *D. pycnosperma*; Schulz very evidently not understanding *D. canadensis* but giving under it a very full and accurate account of the wholly distinct plump-fruited *D. pycnosperma* (PLATE 306). In view of the great range of shape and size of the siliques (PLATES 314, 315), from narrowly lanceolate to elliptic or ovate and either twisted or plane, Schulz's description of them (his p. 275) as "lineari-lanceolatae" is peculiarly inadequate.

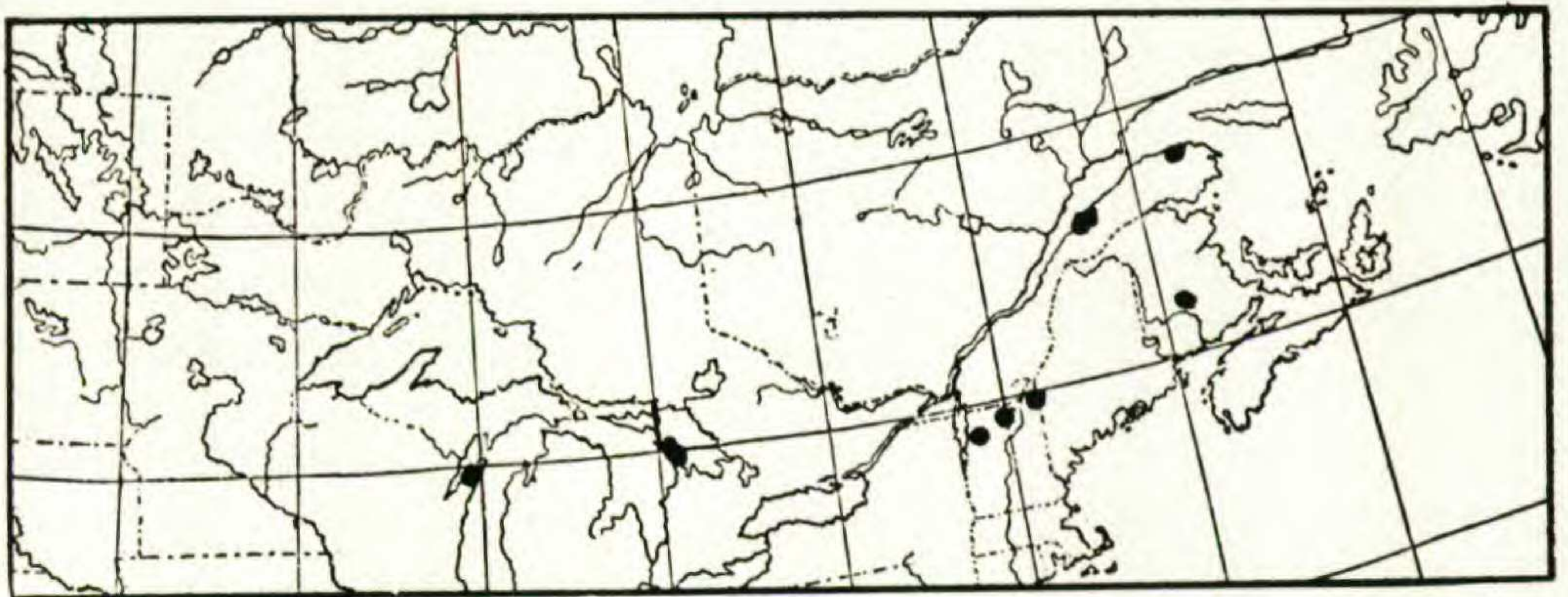
Although the characterization of *Draba arabisans* in *Das Pflanzenreich* assigns the species "Semina minora, vix 1 mm longa," I am unable, in the many hundreds of fruiting specimens now before me, to find well-developed seeds as short as 1 mm.; all good seeds are at least 1.1 mm. long and they range up to a length of 1.7 mm. In fact, flat-fruited *D. arabisans* can quickly be distinguished from *D. glabella* and its var. *orthocarpa*, with which it has been confused, by the seeds alone: in *D. arabisans* 1.1–1.7 mm. long, in *D. glabella* and var. *orthocarpa* 0.7–1 mm. long.

For discussion of Mrs. Ekmans quite untenable opinion that *D. arabisans* is a hybrid of *D. aurea* and *D. glabella* (*D. daurica*) see p. 251.

Ehlers, no. 1103, from limestone rocks, Prentis Bay, Mackinac Co. (Herb. Univ. Mich.), in mature fruit was recorded as *D. aurea* by Walpole, Proc. Mich. Acad. Sci. vi. 313 (1926).

18. *D. LANCEOLATA* Royle. *Perennial*, with simple to multicapital caudices, forming tufts or mats 0.2–1.5 dm. across; the caudex or its branches retaining many marcescent leaves or their shreds: *rosettes*

1.5–8 cm. across; *their leaves crowded*, oblanceolate or spatulate, entire or remotely dentate, 0.7–4 cm. long, 1–8 mm. broad, *cinereous with dense and soft stellate tomentum*: flowering stems 1–30, simple or branching, 0.5–3.5 dm high, *stellate-tomentulose* and very short-pilose: cauline leaves 2–10, lanceolate, oblong or narrowly ovate, entire, denticulate or coarsely dentate, somewhat stellate-tomentulose and often short-pilose, 0.5–3 cm. long: *racemes* dense to lax, *often leafy-bracted at base, in maturity elongating to $\frac{1}{3}$ – $\frac{4}{5}$ the full height of the plant*: pedicels strongly ascending in fruit: sepals narrowly oblong, pilose, 2–3 mm. long: petals white, obovate, emarginate, 3–5 mm. long: ovary stellate-pilose: *siliques linear-lanceolate to ellipsoid-ovoid, plump, with convex valves*, 4–14 mm. long, 1.5–2.5 mm. broad, *densely stellate-pannose*, twisted or plane; the style very short (up to 0.75 mm. long): seeds 20–48, 0.7–1 mm. long.—Illustr. Bot. Himal. Mts. i. 72 (1839); O. E. Schulz in Engler, Pflanzenr. iv¹⁰⁵. 296 (1927). *D. incana* Reichenb. Ic. Pl. Crit. viii. 28, t. 769, fig. 1031 (1830); Gray, Man. ed. 5: 71 (1867), in large part; not L. *D. confusa* of many Asiatic authors, not Ehrh. *D. stylaris* Fern. & Knowlt. RHODORA, vii. 64, t. 60, figs. 3–5 (1905) and later Amer. authors; N. Busch, Fl. Sib. iii. 375 (1919); Pohle in Fedde, Repert. Beih. xxxii. 52 (1925); not J. Gay (1818), acc. to Schulz. *D. cana* Rydb. Bull. Torr. Cl. xxix. 241 (1902); O. E. Schulz, l. c. 298 (1927). *D. valida* Goodding, Bot. Gaz. xxxvii. 55 (1904); O. E. Schulz, l. c. 294 (1927).—Northern and alpine regions of Asia and North America; in America from eastern Quebec to Yukon, locally south to New Brunswick, northern New



MAP 22. Eastern American Range of DRABA LANCEOLATA.

Hampshire, northern Vermont, Ontario, Michigan, Wisconsin, Colorado and Utah. The following are the eastern American specimens seen. QUEBEC: lower dry calcareous slaty talus of Mt. St. Pierre, Gaspé Co., Fernald, Weatherby & Stebbins, no. 2446; cold and shaded limestone-conglomerate ridge from Pointe aux Corbeaux to Cap Caribou, Bic, Fernald & Collins, no. 1077; crevices of dry calcareous rock, Cap Enragé, Bic, Collins & Fernald, no. 90; sur le conglomérat nu, au nord du Cap Enragé, Bic, Rousseau, no. 26,585; talus of limestone-

conglomerate sea-cliffs, alt. 200–275 m., east of St. Fabien, *Fernald & Collins*, no. 1078 (lax state); exposed crests of limestone sea-cliffs, east of St. Fabien, *Fernald & Collins*, no. 1079. NEW BRUNSWICK: dry rocks, Nashwaak, 1881, *J. Moser* in herb. N. B. Nat. Hist. Soc. NEW HAMPSHIRE: dry cliff, Diamond Peaks, Dartmouth College Grant, *Pease*, no. 20,614. VERMONT: dry cliffs, Willoughby, *Horace Mann*, *Edw. Tuckerman* and many others; dry alpine cliffs, Smuggler's Notch, Mt. Mansfield, August 2, 1893, *Eggleston*. ONTARIO: limestone boulders, foot of cliffs, Smoky Head, north of Lion's Head, Bruce Co., *Stebbins et al.*, no. 143; limestone ledges near shore of Georgian Bay, north of Dyer's Bay, Bruce Co., *Stebbins et al.* no. 144. MICHIGAN: crevices and talus of limestone cliff, Burnt Bluff, Delta Co., *Fernald & Pease*, no. 3318.¹ WISCONSIN: summit of cliff, Fish Creek, Door Co., *Fassett*, no. 15,566 (lax state). Mostly distributed as *D. incana* or *D. stylaris*. Previously cited specimens from Labrador and Newfoundland were erroneously identified. PLATES 316, 317, 318; MAP 22.

Draba stylaris J. Gay, to which our plant was referred by Knowlton and me when we pointed out its differentiation from the chiefly annual and biennial long-pilose *D. incana*, is, according to Schulz, one of the variants of *D. incana*, confined to continental Europe and the Caucasus. That being admitted it is necessary to seek the next available name for the perennial, matted, canescent plant of Asia and North America.

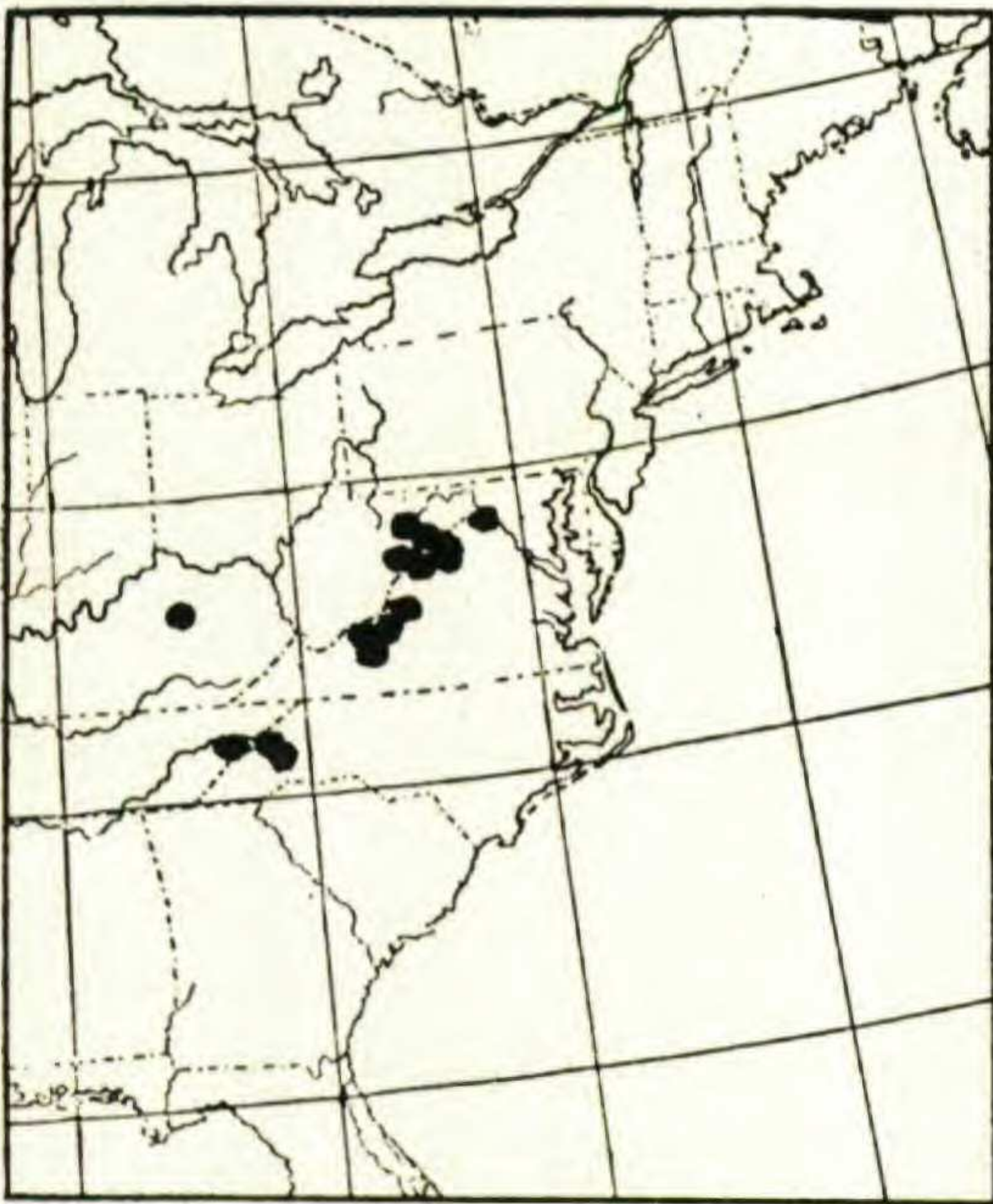
Although Schulz keeps apart as species *D. lanceolata* Royle (1839) (PLATES 317, FIGS. 1 and 2, and 318, FIG. 2) as strictly Asiatic, and *D. cana* Rydberg (1902) (PLATES 316, 317, FIGS. 3 and 4, and 318, FIG. 1) and *D. valida* Goodding (1904) (PLATE 317, FIG. 5) as strictly North American, I can get no satisfactory distinctions between them. They all show, furthermore, the well known arctic-alpine dispersal on the two continents and it is significant that, although Schulz maintains both *D. cana* (TYPE shown in PLATE 318, FIG. 1) and *D. valida* (TYPE shown in PLATE 317, FIG. 5) as species, Rydberg, who was not averse to maintaining weak species, has regularly united them in his later work. It is also significant that Schulz's description of *D. cana* consists merely of a comparison of it with *D. lanceolata*. The few differences pointed out by him, slight divergences in size of leaves and siliques, do not hold either in the Asiatic specimens before me nor in the larger American series (see PLATES 316–318).

DRABA CINEREA Adams, Mem. Soc. Nat. Mosc. v. 103 (1817) (*D.*

¹The Michigan station should be added to MAP 22, on the peninsula 1 mm. (on the map) northeast of the Wisconsin station.

arctica J. Vahl, Fl. Dan. xiii. fasc. xxxix. 5, t. 2294 (1840)), has been found on the western side of Hudson Bay, as far south as Cape Henrietta Maria. It is likely to be found on the Labrador Peninsula. From *D. lanceolata* it differs in its few (1-4) remote cauline leaves, its fruiting racemes barely half the height of the plant and borne far above the upper leaf, and the seeds fewer (at most 36).

19. *D. RAMOSISSIMA* Desv. *Perennial*, forming broad mats (up to 2 or 3 dm. broad); the elongate humifuse branches and branchlets of the caudex covered below with marcescent shreds of old leaves and ending in rosettes 2-10 cm. across: *rosette-leaves* membranaceous, cuneate-oblancheolate, 1-5 cm. long, 2-15 mm. broad, minutely pilose, with 1-5 pairs of frequently *horizontally divergent narrow teeth* (sometimes with secondary teeth), or merely low-serrate: *flowering stems* 0.7-4.5 dm. high, *divergently branched above, forming corymbosely paniculate inflorescences*, pubescent with short branching, substellate and simple trichomes intermixed, leafy: cauline leaves 2-24 (rarely almost wanting), lanceolate, oblong, elliptic or ovate, acute, coarsely serrate to deeply pectinate, 0.5-4.5 cm. long, 0.1-2.2 cm. broad: *racemes corymbosely paniculate*, becoming very loose: *pedicels* filiform, elongate: *sepals* oblong or narrowly ovate, 2-3.3 mm. long: *petals* white or whitish, narrowly obovate or broadly spatulate, 5-7 mm. long: *anthers* about 0.5 mm. long: *ovary* pubescent: *siliques long-pedicelled*,



MAP 23. Range of DRABA RAMOSISSIMA.

linear-lanceolate to elliptic-oblong, usually spirally twisted, stellate-pubescent, 3-11 mm. long, with filiform style 1.5-3 mm. long: seeds 7-15, 1.2-1.8 mm. long.—Journ. de Bot. iii. 186 (1814); DC. Syst. ii. 355 (1821) and Prodr. i. 171 (1824); Torr. & Gray, Fl. N. Am. i. 106 (1838); Watson in Gray, Syn. Fl. N. Am. i¹. 111 (1895); Britton in Britt. & Brown. Ill. Fl. ii. 142, fig. 1761 (1897); O. E. Schulz in Engler, Pflanzenr. iv¹⁰⁵. 187 (1927). *D. arabisans* Pursh, Fl. Am. Sept. ii. 434 (1814), as to Virginia plant, not Michx. *Alyssum dentatum* Nutt. Gen. N. Am. Pl. ii. 63 (1818). *D. dentata* (Nutt.) Hook. & Arn. in Hook. Journ. Bot. i. 192 (1834); Hook. Icon. Pl. i. t. xxxi. (1837).—Cliffs and rocks, Virginia, West Virginia, Kentucky, Tennes-

see and North Carolina, highly variable in size and tothing of leaves. The species is so very distinct and of such isolated range (as compared with the other and more northern perennial species) that it is unnecessary to cite the numerous specimens. Those examined come from the following counties. VIRGINIA: Page, Shenandoah, Rockingham, Rockbridge, Roanoke, Giles and Pulaski Cos. WEST VIRGINIA: Jefferson, Hardy, Grant and Pendleton Cos. KENTUCKY: Fayette Co. (and doubtless elsewhere). TENNESSEE: Cocke Co. NORTH CAROLINA: Madison and Buncombe Cos. Well illustrated, as *D. dentata* (Nutt.) Hook. & Arn. in Hook. Icon. Pl. i. t. xxxi (1837). MAP 23.

Draba ramosissima is one of the most distinct species of eastern North America. Although varying greatly in stature, size and depth of tothing of leaves and length of siliques it stands well apart from other American species. Schulz places it, along with *D. aurea*, *D. aureola* and other species with orange or yellow petals in his section *Phyllodraba* and includes it in his key under the call: "I. Flores flavi" (pp. 173, 174), though in the fuller description (p. 187) he slightly reduces the shock by saying "Petala dilute flava." The petals, according to those who have collected the plant, are the white of those of *D. arabisans*, *D. incana*, *D. glabella* and the others of Schulz's section *Leucodraba* ("Flowers white"—*Torr. & Gray, Fl. No. Am. i. 106; "flowers white"—Gray, Man. ed. 2: 36; "flowers white"—Britton in Britt. & Brown, Ill. Fl. ii. 142; "petals white"—Small, Fl. Se. U. S. 480). So white are the petals that when Pursh (Fl. Am. Sept. 434) "collected specimens on the rocks near Harper's Ferry" (very possibly the type-station of *D. ramosissima*) he mistook it for the white-flowered *D. arabisans* Michx.

20. *D. APRICA* Beadle. *Annual* or winter-annual: stems 0.5–3.5 dm. high, simple below or loosely branched and stellate-puberulent; rarely with elongate branches above, but with abbreviated or sessile short corymbs in the middle and upper axils: lower leaves obovate to rhombic-oval, coarsely



MAP 24. Range of *DRABA APRICA*.

2-4-dentate, thin, petioled, 0.7-2 cm. long, minutely strigose-hirtellous with irregularly stellate trichomes; cauline leaves remote, up to 17 in number, sessile, narrowly obovate to narrowly oblong or the upper linear-lanceolate, 0.5-2 cm. long, entire or sparsely dentate: *flowers apparently hermaphrodite, some apetalous, others petaliferous*: pedicels stellate-puberulent: sepals narrowly oblong, 0.8-1 mm. long: *petals, when present, white, spatulate, 2.5-3 mm. long (acc. to Beadle)*: *siliques linear-ellipsoid, 4-6 mm. long, minutely stellate-puberulent, tipped by a minute slender style*: *seeds 6, oblong-oval, 1-1.5 mm. long*.—Beadle in Small, Fl. Se. U. S. ed. 2, Append. 1336 (1913); O. E. Schulz in Engler, Pflanzenr. iv¹⁰⁵. 339 (1927).—GEORGIA: "common" on Kenesaw Mt., near Marietta, May 9, 1901, Biltmore Herb. (TYPE, Herb. N. Y. Bot. Gard.); dry, open northern and northeastern slope, near the top, Kenesaw Mt., May 5 and 12, 1934, L. M. Perry & M. C. Myers, nos. 750, 751. PLATE 319, FIGS. 8-10; MAP 24.

Draba aprica is little known. Until its rediscovery by Dr. Perry and Mr. Myers in the spring of 1934, the only material I had seen was the type sheet, which contains three fruiting specimens, two of them with the stems simple except for the abbreviated upper branches (FIG. 8), the third a taller plant which might well have been 3.5 dm. high (the terminal raceme broken off) and bearing a few elongating axillary racemes, apparently a response to the breaking off of the top. The original label states that it is "common"; but Dr. Perry's experience indicates that, in 1934 at least, it is not abundant. I quote from her letter of May 28, 1934.

On May 5th I took the train [from Athens, Georgia] for Marietta, was joined by Mr. Myers, a former student of mine, and we proceeded to Mount Kenesaw. It is a rugged and rough hill in two parts. We were able to cover but one part that day between trains, and I must own that I was somewhat discouraged. We were almost to the top of the northeast slope before Mr. Myers, who was some ten feet ahead of me, stopped and said, "here it is, Dr. Perry," and handed me a specimen. We had been made so confident by the "common" on the label which you described that I couldn't understand what was the matter with my eyes. There were ten to fifteen plants in that spot. We found one other spot and that is all. The mountain is pretty open on top but I believe it had been burned over either early this spring or very late last fall. Anyhow, a job half done isn't done at all, and to convince you that I was painstaking about it, on my own I hired a car the next Saturday and that day we covered the other part of the mountain, somewhat more leisurely as we had no train to make. In all we probably found 50 *good* specimens, so I can assure you that the little *Draba* is very rare, this season at any rate.

Dr. Perry further informs me that *Draba aprica* is closely associated with *Viola Rafinesquii* Greene and *Oxalis violacea* L.

Schulz suggested that *Draba aprica* is to be compared with *D.*



DRABA ARABISANS: FIG. 1, portion of flowering branch, $\times 1$, from Ontario; FIG. 2, fruiting branch, $\times 1$, from type region, Lake Champlain, Vermont; FIG. 3, fruiting branch, $\times 1$, from Quebec; FIG. 4, fruiting raceme, $\times 1$, from type region, Lake Champlain; FIG. 5, silique, $\times 10$, from type region; FIG. 6, small rosette-leaf, $\times 10$, from Newfoundland.



DRABA ARABISANS: FIG. 1, portion of fruiting branch, $\times 1$, of short-fruited plant (isotype of *D. megasperma*, var. *leiocarpa* O. E. Schulz) from Bic, Quebec; FIG. 2, short fruiting raceme, $\times 1$, from Percé, Quebec; FIG. 4, small plant, $\times 1$, approaching var. CANADENSIS, from Newfoundland; FIG. 5, silique, $\times 10$, from FIG. 1.

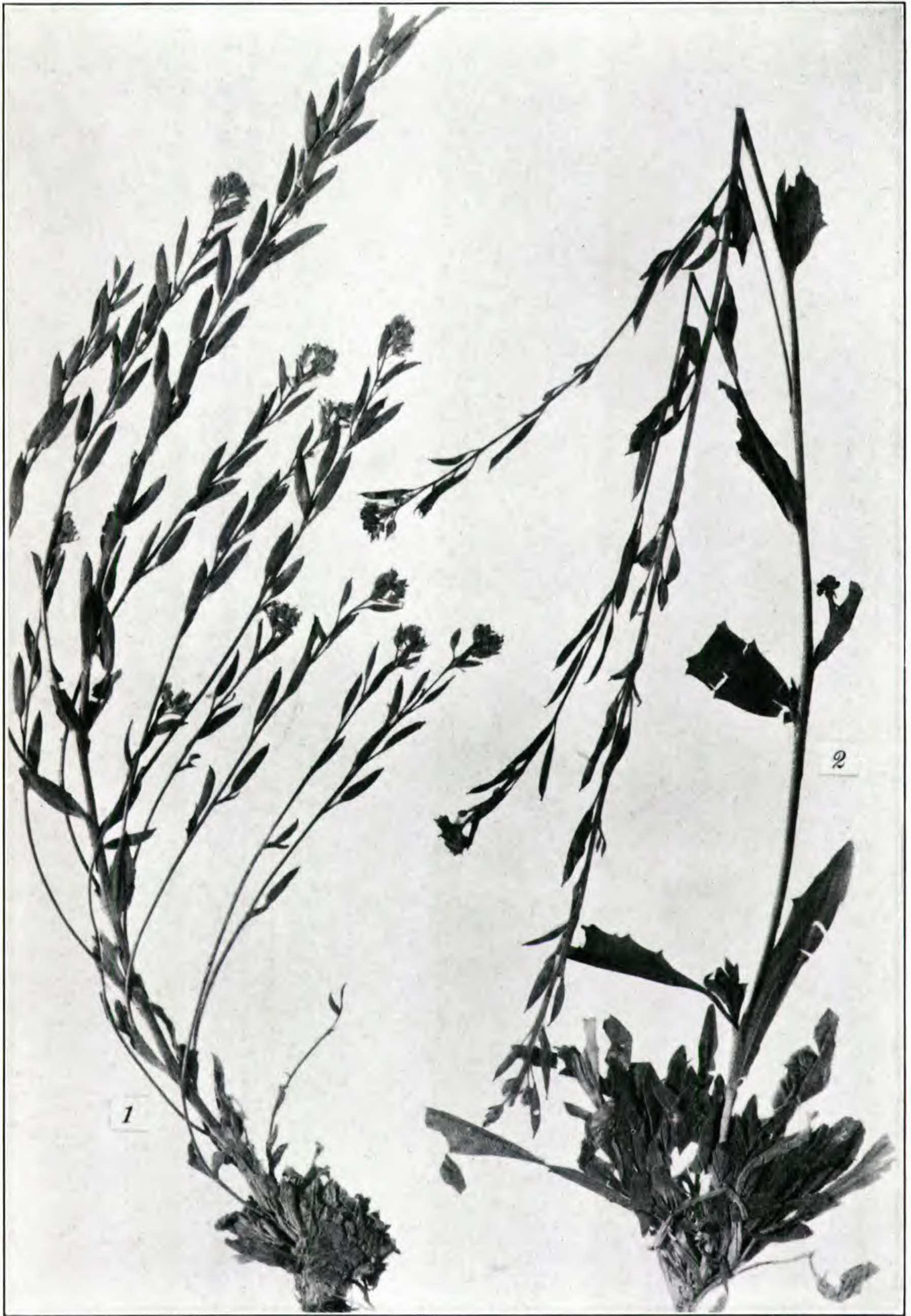
DRABA ARABISANS, var. CANADENSIS: FIG. 3, fruiting raceme, $\times 1$, of isotype, from Cape Tourmente, Quebec; FIG. 6, silique, $\times 10$, from FIG. 3.



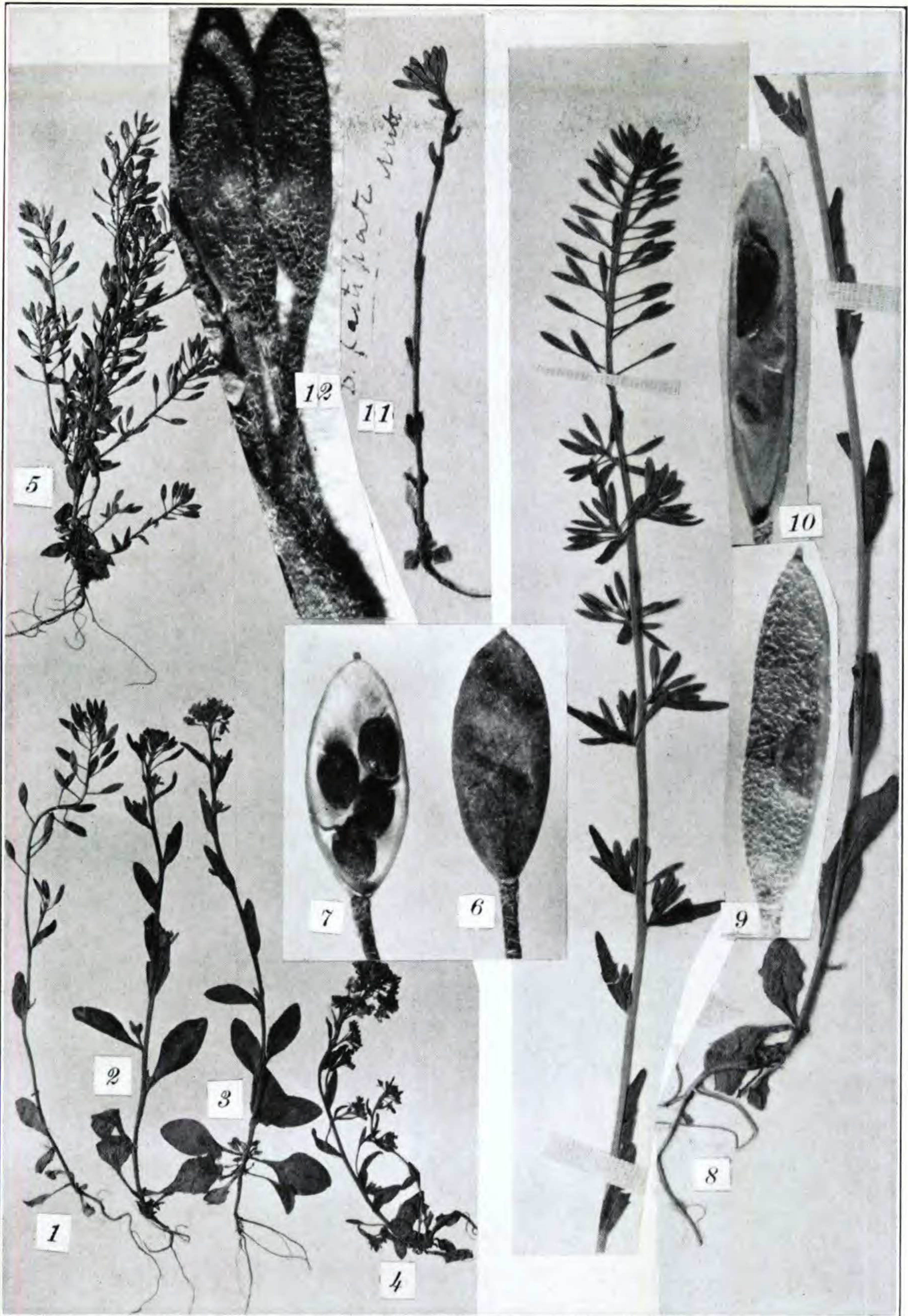
DRABA LANCEOLATA: FIG. 1, portion of slender fruiting plant, $\times 1$, from Quebec; FIG. 2, portion of slender fruiting plant, $\times 1$, from Ontario; FIG. 3, center of rosette, $\times 10$, from Quebec; FIG. 4, portion of internode, $\times 10$, from Quebec; FIG. 5, silique, $\times 10$, from Vermont.



DRABA LANCEOLATA: FIG. 1, flowering plant, $\times 1$, from Ajan, Siberia; FIG. 2, fruiting plant, $\times 1$, from Songaria; FIG. 3, flowering stem, $\times 1$, from Vermont; FIG. 4, fruiting plant, $\times 1$, from Quebec; FIG. 5, fruiting plant, $\times 1$, from Utah (isotype of *D. valida* Goodding).



DRABA LANCEOLATA: FIG. 1, low branching plant (type of *D. cana* Rydb.), $\times 1$, from Alberta; FIG. 2, flowering plant, $\times 1$, from eastern Siberia.



DRABA BRACHYCARPA: FIG. 1, fruiting plant, $\times 1$, from Indiana; FIG. 2, small-flowered plant, $\times 1$, from Tennessee; FIG. 3, large-flowered plant, $\times 1$, from Virginia; FIG. 4, large-flowered plant, $\times 1$, from Missouri; FIG. 5, fruiting plant, $\times 1$, from Tennessee; FIG. 6, silique, $\times 10$, from FIG. 5; FIG. 7, septum and seeds, $\times 10$, from FIG. 5.

DRABA BRACHYCARPA, var. *FASTIGIATA*: FIG. 11, TYPE, $\times 1$; FIG. 12, siliques, $\times 10$, of TYPE.

DRABA APRICA: FIG. 8, TYPE, $\times 1$; FIGS. 9 and 10, silique and septum with seed, $\times 10$, from TYPE.

brachycarpa Nutt., var. *fastigiata* Nutt. in Torr. & Gray, Fl. N. Am. i. 108 (1838) and he published the needless binomial "Nuttall 1825 als *Draba fastigiata* msc. in hb. Delessert!"—Schulz, l. c. 339 (1927). *D. brachycarpa*, var. *fastigiata* was separated from typical *D. brachycarpa* as "more pubescent; stem mostly simple; radical leaves mostly 4-toothed; silicles pubescent."

Whether *Draba aprica* should include *D. brachycarpa* var. *fastigiata* is at present not wholly clear. The type sheet of *D. brachycarpa* from the Torrey Herbarium is before me. It consists of the original Nuttall material from Arkansas, four plants at the top of the sheet; and at the bottom the plants from Millidgeville, Georgia, *Boykin* and from Macon, Georgia, *Loomis*, originally cited for *D. brachycarpa*, and a third and different specimen without designation of locality but presumably from near St. Louis, Missouri, the fourth locality given by Torrey & Gray. The four specimens of the original Nuttall collection from Arkansas are two branching plants which must stand as the type of Nuttall's species and which are thoroughly typical of that species as understood. Alternating with them on the sheet are two unbranched individuals, one with the raceme gone, the other (FIG. 11) with a compact terminal raceme of a few stellate-pubescent oblong silicles (FIG. 12). The two simple specimens are marked in Nuttall's hand *D. fastigiata* and must stand as the type of *D. brachycarpa*, var. *fastigiata*. In view of the fact that the larger specimen of the two has lost its raceme, I refrain from opening one of the immature silicles of the remaining individual. The seeds of this plant, if mature, would quickly settle whether it is a very unusual variation of *D. brachycarpa* (PLATE 319, FIGS. 1-7), which otherwise has oblong and glabrous silicles, or a very dwarf and atypical representative of the highly localized *D. aprica*. The collections in the Gray Herbarium and at the New York Botanical Garden show no *D. brachycarpa* with pubescent silicles; and, in view of the presence on Nuttall's sheet of specimens of typical *D. brachycarpa* from two Georgia stations, it is not impossible that the two plants of var. *fastigiata* came, not from Arkansas, as supposed, but from Kenesaw Mt. in Georgia, which is easily reached from Atlanta. Students of the Arkansas flora should watch for and, if possible, collect material to settle this dilemma.

21. *D. BRACHYCARPA* Nutt. *Annual or biennial* (forming rosettes the first year): *stems simple or more commonly bushy-branched* either from the base or from the upper axils, stellate-hirtellous or -strigose,

0.4–2 dm. high: basal leaves elliptic, oval or obovate, petioled, 0.5–2 cm. long, stellate-pubescent; cauline leaves 3–12, smaller and narrower, sessile, the upper nearly linear: *racemes* at first dense, *in fruit becoming lax* and up to 7.5 cm. long: pedicels spreading-ascending, glabrous to stellate-hirtellous, the lower becoming 1–5 mm. long: *flowers dimorphic or trimorphic*,¹ the smaller apetalous, others with small narrow petals, others with conspicuous white petals: sepals oblong to ovate (in larger flowers), 1–1.5 mm. long, glabrous or sparsely pilose: *larger petals obovate*, 2–3 mm. long: *pistils glabrous, with 10–16 ovules: siliques oblong-ellipsoid, 1.7–5 mm. long, glabrous: seeds 0.5–0.8 mm. long.*—Nutt. in Torr. & Gray, Fl. N. Am. i. 108 (1838); Darby, Man. Bot. ii. 24 (1841); Gray, Man. ed. 2: 37 (1856); Chapm. Fl. So. U. S. 29 (1860); Watson in Gray, Syn. Fl. N. Am. i.¹ 107 (1895); Britton in Britton & Brown, Ill. Fl. ii. 143, fig. 1762 (1897); Small, Fl. Se. U. S. 480 (1913); O. E. Schulz in Engler, Pflanzenr. iv¹⁰⁵. 338, fig. 32 (1927). ?*Discovium gracile* Raf. Journ. de Phys. lxxxix. 96 (1819). ?*Discovium Ohiotense* DC. Syst. ii. 700 (1821). *Alyssum bidentatum* Nutt. ex Torr. & Gray, l. c. (1838) as syn. *Abdra brachycarpa* (Nutt.) Greene,

¹ "This humble white flower is at this season very abundant on the grassy hills about town, associated with *Draba Caroliniana*, the pretty *Houstonia minima*, with *Androsace occidentalis*, *Plantago pusilla*, *Ranunculus fascicularis*, *Myosurus minimus*, and the completely naturalized *Capsella*. In ordinary or in wet springs the flowers are all regularly formed and comparatively large, having a diameter of about 2 lines; in very dry springs, however, such as the present one, a form with very inconspicuous flowers becomes common, which in isolated specimens in the herbarium might be taken for a distinct species, but, studied on its native hills in thousands of specimens, clearly proves to be nothing but a depauperate or abortive state and not even a clearly defined variety.

During a late excursion to our commons in company with Dr. Hilgard, he ascertained that on the northern slopes of hills and sinkholes, and near the edge of ponds, the plant had the ordinary appearance, but on the sunny and dry or even arid southern slopes not a single one among the thousands of specimens could be found the flowers of which were not quite inconspicuous; in intermediate situations the size and organization of the flowers were also intermediate.

These incomplete flowers are smaller in all their parts than the regular ones; the sepals are erect and rather persistent; the petals always shorter than the sepals, but variable in size, shape, and number, or even entirely absent; the stamens always abortive and often reduced in number; the ovary shorter but fertile.

The petals ordinarily broadly obovate-spatulate, retuse, over 1 line long, are here linear-spatulate, entire, emarginate or bilobed, 1/6–1/3 line long, 2 or 4 in a flower, often of unequal size in the same flower, or entirely absent. The slender filaments bear a bilobed cellular head, often not more than 0.05 line long, representing the anther, but without any regular structure. He found in single flowers 4, and often 5 or 6 of them, without petals, or associated with 2 or 4 rudimentary petals. It appears that in some incomplete tetrandrous flowers the pairs of stamens adhere to the base of the corresponding exterior, and the pairs of petals to that of the interior sepals; the 8 organs forming rather one than two cycles.

How these female plants, as they must be called, which, this spring at least, form the immeasurably largest part of the whole crop, can be fertilized by the few complete ones growing in the neighborhood, is not easy to understand.

Does not this dimorphism obtain in other species of this genus, in *Lepidium* and other *Cruciferae*, and would not several so-called species fall, if correctly understood, under other fully developed ones as incomplete forms?"—Engelm. Trans. Acad. Sci. St. Louis, ii. 154 (1862).

Pittonia, iv. 207 (1900). *D. brachyc.*, vars. *apetala* and *grandiflora* Engelm. ex O. E. Schulz, l. c. 339 (1927) as syns. *D. bidentata* Nutt. ex O. E. Schulz, l. c. 339 (1927) as syn.—Dry to moist open soil and waste ground, northern Florida to Texas, north to Virginia, southern Ohio (?), Indiana, Illinois, Missouri and Kansas; also (adventive?) in Oregon. Flowers late winter and early spring. PLATE 319, FIGS. 1-7.

For discussion of the problematical *Draba brachycarpa*, var. *fastigiata* see notes under *D. aprica*.

Draba brachycarpa is inclined to be a weed of roadsides and waste places and its present northern limits have doubtless been extended beyond its primitive range.

There are two names earlier than *Draba brachycarpa* (1838) which need explanation. Here possibly belongs *Discovium gracile* Raf. (1819), "Trouvé en juin sur les rives de l'Ohio, près de Gallipolis." Rafinesque's description, save for "Fleurs jaune" (an error independently committed by some later authors) and for the month June, which is rather late, strongly suggests that he had *Draba brachycarpa*, although I know of no evidence of the species now being found in Ohio (it is in Tennessee, Indiana and Illinois). I have seen none of Rafinesque's material but it is apparently preserved in the DeCandolle herbarium at Geneva. Should it prove, as I surmise, to be *Draba brachycarpa*, *Discovium gracile* (1819) cannot displace the name *Draba brachycarpa* (1838) because of *Draba gracilis* Graham (1828). A complicating situation arises through the fact that DeCandolle in 1821 called Rafinesque's species *Discovium Ohiotense*, without citing *Discov. gracile* as a synonym. Consequently, it might plausibly be urged that De Candolle's specific epithet should be used (when and if the species proves to be *Draba brachycarpa*). It should be noted, however, that DeCandolle exactly translated Rafinesque's French diagnosis of *Discov. gracile* into Latin and added nothing to it, even citing the identical habitat: "Ad ripas fluminis Ohio prope Gallipoli." It should be evident, therefore, that, although he did not mention *Discov. gracile* Raf. as the basis of his *Discov. Ohiotense*, DeCandolle was, in fact, publishing a needless new name for it. As an illegitimate name, *Discov. Ohiotense* cannot be taken up to displace the legitimate *Draba brachycarpa*, even though it antedates it by seventeen years.

22. *D. NEMOROSA* L. Annual or winter-annual 0.5-3 dm. high, simple or with few ascending branches: stem hispid with simple, bifurcate and stellate trichomes variously intermixed: rosette-leaves